



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/613,069	07/07/2003	Hiroyuki Kunishima	NE-70085US	8547

21254 7590 11/10/2004

MCGINN & GIBB, PLLC
8321 OLD COURTHOUSE ROAD
SUITE 200
VIENNA, VA 22182-3817

EXAMINER

HUYNH, ANDY

ART UNIT	PAPER NUMBER
----------	--------------

2818

DATE MAILED: 11/10/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/613,069

Applicant(s)

KUNISHIMA ET AL.

Examiner

Andy Huynh

Art Unit

2818

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 October 2004.
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-51 is/are pending in the application.
4a) Of the above claim(s) 1-34 is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 35-51 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☒ The drawing(s) filed on 07 July 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 07/07/03.
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date: _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

In the Response to the Restriction Requirement dated October 28, 2004, Applicant has elected the invention of Group II, claims **35-51** drawn to a device, without traverse is acknowledged. Accordingly, claims **1-34** are withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 35 § 1.142(b) and MPEP § 821.03. Applicant has the right to file a divisional application covering the subject matter of the non-elected claims **1-34**.

Priority

Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d) based on an application filed in JAPAN, 2002-198432 on 07/08/2002.

Information Disclosure Statement

This office acknowledges receipt of the following items from the applicant: Information Disclosure Statement (IDS) filed 07/07/2003 and 09/02/2003. The references cited on the PTOL 1449 form have been considered.

Drawings

The drawings are objected for the following reason.

Figures 1a-1b should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g).

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims **45-47** are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims **45 and 47** recite the limitation "... the identical interconnect layer ..." there is insufficient antecedent basis for this limitation in the claims.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

Claims **35-44, 48 and 49** are rejected under 35 U.S.C. 102(e) as being anticipated by Uzoh et al. (USP: 6,465,376 hereinafter referred to as "Uzoh").

Regarding claim **35**, Uzoh discloses in Figs. 6 and 7 and the corresponding texts as set forth in column 2, line 53-column 4, line 26, a semiconductor device comprising:

a semiconductor substrate (1); and

a dissimilar element-diffused metal layer (8) formed on said semiconductor substrate, containing copper (Cu) and a dissimilar element (Cu alloy) other than copper and having a generally uniform orientation at a surface thereof (col. 3, lines 7-11).

Art Unit: 2818

Regarding claim **36**, Uzoh discloses in Figs. 6 and 7 and the corresponding texts as set forth in column 2, line 53-column 4, line 26, a semiconductor device comprising:

a semiconductor substrate (1); and

a dissimilar element-diffused metal layer (8) formed on said semiconductor substrate, containing copper (Cu) and a dissimilar element (Cu alloy) other than copper, constituted of grains of an average size not less than 1 μm (col. 4, lines 12-17).

Regarding claims **37 and 38**, Uzoh discloses the semiconductor wherein an average grain size of crystals of said dissimilar element-diffused metal layer is greater than an average thickness of said dissimilar element-diffused metal layer (col. 4, lines 12-26).

Regarding claims **39 and 40**, Uzoh discloses the semiconductor wherein a surface of said dissimilar element-diffused metal layer has an orientation of (200). It is inhering that after annealing at a desired temperature or heat treatment a surface of said dissimilar element-diffused metal layer would result in having an orientation of (200) (col. 3, lines 22-25).

Regarding claims **41 and 42**, Uzoh discloses in Figs. 6 and 7 the semiconductor device wherein said dissimilar element-diffused metal layer constitutes an interconnect (8), a plug or a pad.

Regarding claims **43 and 44**, Uzoh discloses the semiconductor wherein said dissimilar element-diffused metal layer is formed by plating (col. 3, line 9).

Regarding claim **48**, Uzoh discloses in Figs. 6 and 7 and the corresponding texts as set forth in column 2, line 53-column 4, line 26, a metal interconnect constituted of a plated metal layer (8) comprising a plurality of dissimilar elements (Cu alloy), wherein an average size of grains contained in said plated metal layer is not less than 1 μm (col. 4, lines 12-17).

Art Unit: 2818

Regarding claim **49**, Uzoh discloses in Figs. 6 and 7 and the corresponding texts as set forth in column 2, line 53-column 4, line 26, a metal interconnect constituted of a plated metal layer (8) comprising a plurality of dissimilar elements (Cu alloy), wherein said plated metal layer is constituted of a single grain.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims **50 and 51** are rejected under 35 U.S.C. 103(a) as being unpatentable over Uzoh et al. (USP: 6,465,376 hereinafter referred to as "Uzoh").

Uzoh discloses the claimed limitations except for the metal interconnect having a width not less than 1 μm . It would have been obvious to one having ordinary skill in the art at the time of the invention was made to form the metal interconnect having a width not less than 1 μm , since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Art Unit: 2818

Conclusion

A shortened statutory period for response to this action is set to expire 3 (three) months and 0 (zero) day from the day of this letter. Failure to respond within the period for response will cause the application to become abandoned (see M.P.E.P 710.02(b)).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andy Huynh, (571) 272-1781. The examiner can normally be reached on Monday-Friday from 8:30 AM to 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Nelms can be reached on (571) 272-1787. The Fax number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the -status of this application or proceeding should be directed to the receptionist whose phone number is (703) 308-0956.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Ah

11/08/04



Andy Huynh

Patent Examiner